MEAP

Michigan Educational Assessment Program

MODEL TEST

Science

11th Grade

Released: Summer 2001

MICHIGAN STATE BOARD OF EDUCATION
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The Model MEAP Science Tests

Test Items
MEAP has provided models of the new science test for the 5th, 8th, and 11th grade. These models present examples of the new science test items. By new, all science test items administered after January 1, 2002 will be aligned to the benchmarks within the Michigan Science Curriculum Framework (MSCF, Summer, 2000). The MSCF is available for you to download from this website: cdp.mde.state.mi.us/Science.

The MEAP science test will be composed of (a) independent multiple-choice items, and (b) clusters of 3 multiple-choice items and 1 constructed-response item. All multiple-choice items are worth 1 point, a constructed-response item (i.e. a short written answer) is worth either 3 or 4 points. The 4-point constructed-response items apply to the text-criticism and investigation clusters.

An answer key follows the test items in the model tests. The answer key provides the answers for the multiple-choice items and the point-scoring guide for the constructed-response items. Also listed for each item is its corresponding MSCF benchmark.

The New MEAP Science Test Format
The new 11th-grade science test will have 53 items for 75 points. Included among the items are 10 clusters, 2 each for earth, life, and physical science, along with 2 integrated clusters (i.e. 2 science subjects covered in a single cluster), a text-criticism cluster, and an investigation cluster. The test also has 13 independent multiple-choice items.

Caveat: Though release of the model 11th-grade test precedes next Fall's high school retest period, **the Fall 2001 high school science test remains aligned to MEGOSE (1991).**

The model of the 11th-grade test is **not complete**. The model only presents 1 physical science cluster. The new science test item bank did not have enough of these cluster types to prepare **this model**. (Enough clusters of all types are available to prepare the 2002 MEAP science tests, however.) More test items are now being developed to supply the item bank with all cluster types. Waiting for the next batch of items in order to have complete models would have delayed access to the examples of the science test items.

Also note, the arrangement of items in the model tests do **not** necessarily replicate the final printed format of an actual MEAP Science test in regard to item, cluster, or subject sequence. The test format plans are still in progress.

DIRECTIONS

In this test you will demonstrate your understanding of science.

This test includes both multiple-choice and written-response questions. For the multiple-choice questions, use only a **No. 2 pencil** to mark your answers. Make a dark mark that completely fills the corresponding oval **in your ANSWER BOOKLET**. If you are not sure of the answer to a multiple-choice question, mark your **BEST** choice and go on to the next question. If you change an answer, be sure to erase the first mark completely. Remember, mark only **one** answer for each question.

Following a series of multiple-choice items are constructed-response questions that require a written response. These questions require you to write sentences or paragraphs **in your ANSWER BOOKLET**. Try to show all that you know about the topics by writing as much as you can in response to the questions you are asked. Make sure you at least attempt to answer each question. Record your written responses **in the ANSWER BOOKLET** on the lines or spaces provided. **Make sure the number of the question corresponds to the number in the ANSWER BOOKLET**.

If you do not understand any of these directions, please raise your hand.

You will now begin the test by answering a series of multiple-choice questions, followed by constructed-response questions.

1. What beneficial effect does ozone in the upper atmosphere have on Earth?

A It traps infrared radiation in the lower atmosphere.
B It traps ultraviolet radiation in the lower atmosphere.
C It keeps most infrared radiation from entering the lower atmosphere.
D It keeps most ultraviolet radiation from entering the lower atmosphere.

2. A flat region has a cold, dry, climate. Which of the following observations could you expect to make?

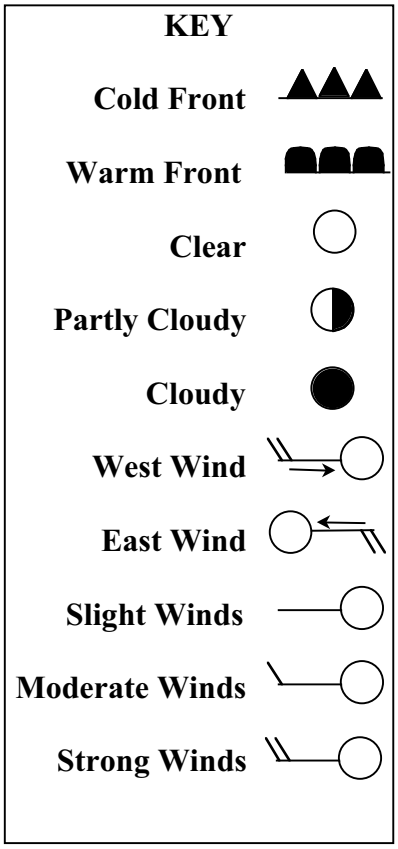
A A rain gauge shows a high reading.
B A hygrometer shows a low reading.
C An anemometer shows a low reading.
D A thermometer shows a high reading.

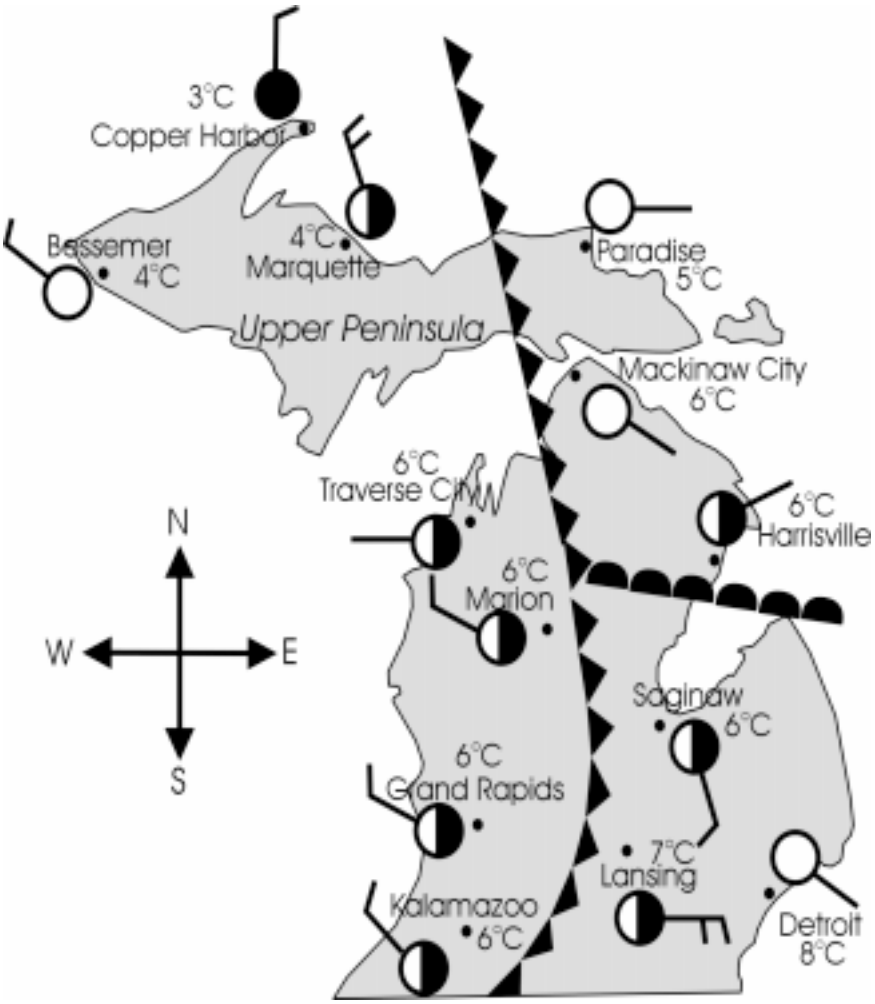
3. Against which of the following is chlorination of water effective?

A acidity
B bacteria
C chlorine
D radioactive waste

4. Retreating glaciers leave which of the following lake formations?

A kettles
B hot spots
C moraines
D water tables





Use the weather symbols on the above weather map of Michigan to answer questions 5 through 8.

5. In which of the following cities in Michigan would an anemometer give the highest reading?

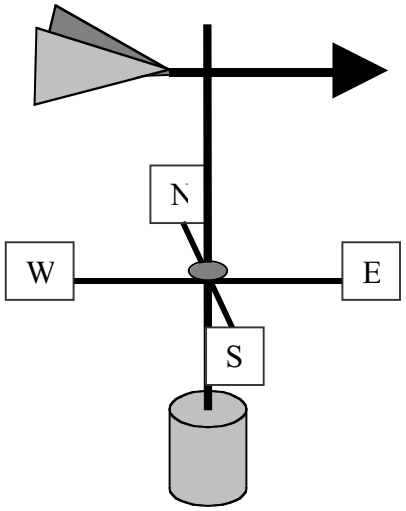
A Detroit

B Lansing

C Paradise

D Harrisville

6. According to the weather map on the opposite page, in which location would the wind vane below appear?



A Paradise

B Saginaw

C Bessemer

D Traverse City

7. An airplane pilot wants to land in the area with the safest weather conditions. In which of the following cities should the pilot land?

A Detroit

B Lansing

C Saginaw

D Marquette

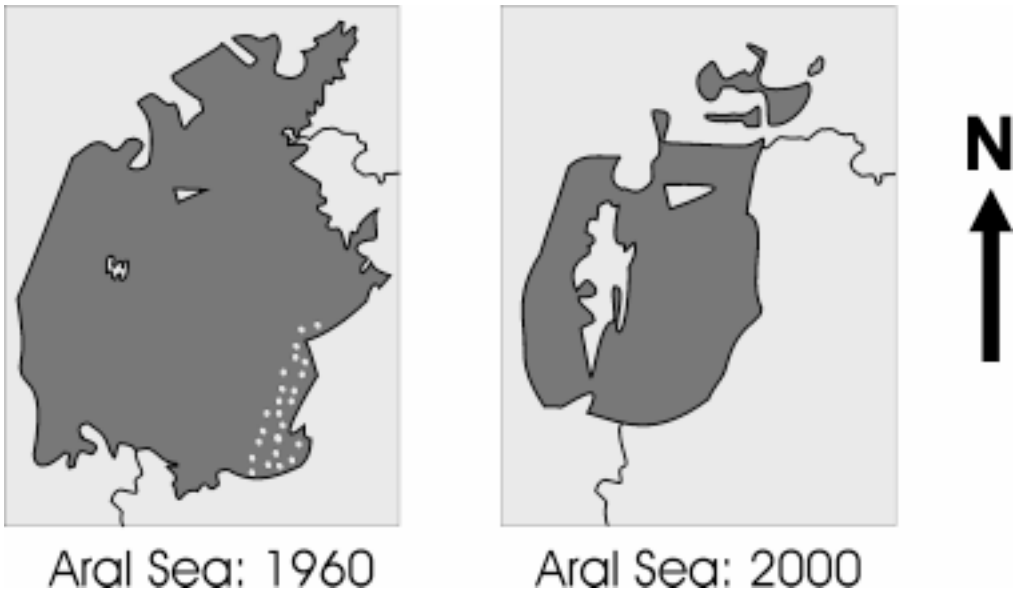
ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER BOOKLET

NOTHING WRITTEN IN THE SPACE BELOW WILL BE SCORED.

(3 points)

8. A student looks at the map and makes two predictions: 1) Saginaw will likely experience storms in the near future, and 2) these storms will be the result of the approaching warm front.

- Identify which prediction is correct and which is incorrect.
- Explain one of your answers.



The Aral Sea is a saltwater sea located in a dry region in Central Asia. In 1960, it was the fourth largest sea in the world. Since then, however, the two rivers that feed the sea have been diverted to irrigate regions hundreds of kilometers away. This has caused its area to shrink, leaving much of the seabed exposed. Despite attempts to stop the shrinkage, most experts believe that the process is not reversible and predict the region will become more desert-like, leaving only a few scattered lakes as remnants of the once great sea.

Refer to the text and picture above to answer questions 9 through 12.

9. With less water flowing into the Aral Sea, less water replenishes what is lost through evaporation. What effect, if any, does this have on the salt concentration of the lake?

A The salt concentration increases.

B The salt concentration decreases.

C The salt concentration drops to zero.

D The salt concentration stays the same.

10. Which of the following explains how the change in the Aral Sea affects the water table in the surrounding areas?

A It will raise the water table.

B It will lower the water table.

C It will increase the salt concentration of the water table.

D It will decrease the salt concentration of the water table.

11. The rivers that feed into the Aral Sea come from mountains to the southeast. How can these rivers carry mostly fresh water when the Aral Sea is so salty?

A The rivers carry much agricultural runoff.

B The rivers are formed by melting glaciers.

C The rivers undergo a natural chlorination process.

D The rivers are heated and purified by global warming.

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER BOOKLET

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(3 points)

12. In 1960, the Aral Sea was the fourth largest sea in the world. By 2000, its area had decreased significantly.

- Explain how the decline of the Aral Sea might affect the local fishing industry.

- Explain how the decline of the Aral Sea might affect the farming industry hundreds of kilometers to the southeast where part of the rivers are diverted.

- What stands might representatives of the fishing industry and the farming industry **MOST LIKELY** take regarding the issue of the Aral Sea?

A form of lake succession called eutrophication occurs when a lake fills with inorganic and organic debris and eventually becomes a field. Water draining into a lake carries nutrients and organic compounds, which stimulate growth of algae and microorganisms. This growth forms an opaque mat on the lake's surface and lowers the level of dissolved oxygen produced by plants in the lake. Over time, the algae and microorganisms become so dense that the oxygen becomes depleted, killing the fish in the lake. Decaying fish bodies and other sediments accumulate on the lake bottom, until gradually the lake becomes land.

Refer to the text above to answer questions 13 through 16.

13. A biologist claims that, during lake succession, fish such as trout are slowly replaced by fish such as bluegills. How must these fish be different for this claim to be **TRUE**?

A Bluegills must require less oxygen than trout.
B Bluegills must have a greater population size.
C Bluegills must require less nitrogen than trout.
D Bluegills must have a higher carrying capacity.

14. Which of the following explains why algae and microorganisms reduce the level of dissolved oxygen?

A Plants below the lake's surface do not have cell walls.
B Plants below the lake's surface can not undergo mitosis.
C Plants below the lake's surface can not undergo meiosis.
D Plants below the lake's surface can not undergo photosynthesis.

15. There is much eutrophication taking place in Lake Mitchell, but in Lake Sarah there is relatively little. You read that this is partially due to the runoff of the different kinds of forests surrounding each lake. Which of the following would have to be true in order to support this claim?

A The trees are taller around Lake Sarah than around Lake Mitchell.

B The trees are taller around Lake Mitchell than around Lake Sarah.

C The forests around Lake Sarah lose their leaves in fall; those around Lake Mitchell do not.

D The forests around Lake Mitchell lose their leaves in fall; those around Lake Sarah do not.

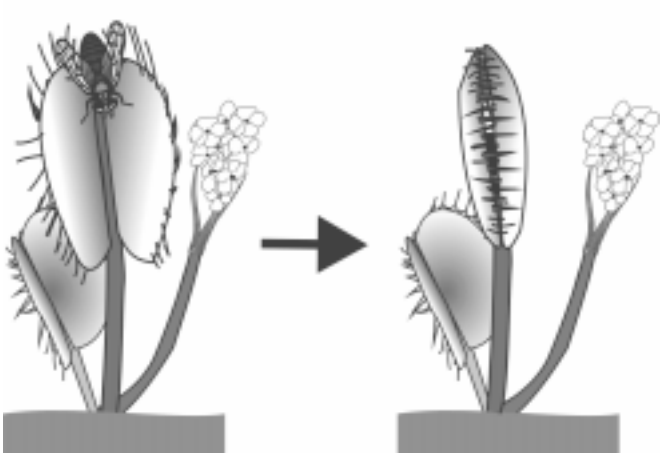
ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER BOOKLET

NOTHING WRITTEN IN THE SPACE BELOW WILL BE SCORED.

(3 points)

16. An ecologist wants to know what nutrient is most important for eutrophication. He takes two samples of lake water and adds 1 mg of phosphorous to one and 1 mg of nitrogen to the other. He then determines which nutrient produces the highest algae concentration.

- Identify two flaws in this investigation.
- Explain one of them.



The venus flytrap is a carnivorous plant that lives in swampy habitats where there is little nitrogen. As a result, the flytrap has evolved to receive nitrogen and other nutrients from insects. The plant has two leaves that resemble jaws, and when the insect lands on the plant, the leaves close on the insect. The plant then digests it.

A researcher grows three venus flytraps in a greenhouse containing swampy soil. Plants 1 and 2 are given equal amounts of fertilizers X and Y respectively. Plant 3 is not given any fertilizer. Fertilizers X and Y differ in the amount of nitrogen they contain.

VENUS FLYTRAP GROWTH CHART

	Height Week 1	**Height Week 2**	**Height Week 3**	**Height Week 4**
Plant 1/Fertilizer X	5.0 cm	5.4 cm	5.7 cm	6.0 cm
Plant 2/Fertilizer Y	5.0 cm	5.2 cm	5.4 cm	5.6 cm
Plant 3/No fertilizer	5.0 cm	5.0 cm	5.1 cm	5.2 cm

Refer to the text, table and picture above to answer questions 17 through 20.

17. What is the control group for this experiment?

A plant 1

B plant 2

C plant 3

D plants 1 and 2

18. What would the researcher need to change in this experiment to determine if a certain species of insect contains high levels of nitrogen?

A Allow all three plants to eat that species of insect.

B Allow only plants 1 and 2 to eat that species of insect.

C Add a 4th plant that would be given a third kind of fertilizer.

D Add a 4th plant that would be given that species of insect and not fertilizer.

19. Which of the following is a source of energy for the plants in this experiment?

A insects

B sunlight

C swamp soil

D nitrogen compounds

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER BOOKLET

NOTHING WRITTEN IN THE SPACE BELOW WILL BE SCORED.

(3 points)

20. This investigation explains how the venus flytrap is able to obtain certain nutrients in the wild.

- How do venus flytraps resemble heterotrophs?

- Provide two reasons why scientists classify venus flytraps as producers despite this similarity to consumers.

21. The greatest mass in any ecosystem is usually found in

A parasites.

B producers.

C consumers.

D decomposers.

22. A particular species of bird can be brown or white. The white color is a recessive trait, while the brown color is a dominant trait. When two brown birds mate, is it possible for them to have white offspring?

A No, because both parents have only genes for being brown.

B Yes, because offspring color does not depend on the genes of the parents.

C Yes, because both parents may have and pass on the gene for being white.

D No, because the parents can pass on only the dominant trait to their offspring.

23. Select and put in sequence the following phenomena involved in photosynthesis:

1. production of carbon dioxide and carbohydrates
2. production of oxygen and carbohydrates
3. exposure to light
4. breakdown of proteins
5. intake of carbon dioxide
6. intake of oxygen

A 3-4-1

B 4-3-2

C 3-5-2

D 3-6-1

24. Cells build new proteins in certain organelles. The instructions for how to construct proteins are inherited. Where are these instructions stored?

A in antibodies

B in the nucleus

C in the cell wall

D in the cell membrane

Read the investigation below and use the information provided to answer questions 25 through 28.

Hypothesis If mutations can affect plant growth, then exposing plant seeds to x-rays will affect plant growth.

Materials

Dental x-ray machine	4 flower pots	4 pepper plant seeds
Water	Labels	Soil

Method Fill each pot with soil and place a pepper plant seed on the surface. Expose three of the four pots to the x-ray machine for different lengths of time, one for 2.5 seconds, one for 5 seconds and one for 10 seconds. Label each pot according to how long it was exposed to the x-ray machine. Label the unexposed pot "0 seconds." Plant each seed and give each pot equal water and sunlight. Record growth of each plant every two weeks for six weeks.

Results After six weeks, the investigators produced the following table.

PEPPER PLANT GROWTH TABLE

X-RAY EXPOSURE TIME	Growth at 2 weeks	Growth at 4 weeks	Growth at 6 weeks
0 Seconds	3.2 cm	10.7 cm	18.8 cm
2.5 seconds	1.7 cm	5.7 cm	12.5 cm
5 Seconds	3.3 cm	11.0 cm	19.3 cm
10 Seconds	3.1 cm	10.4 cm	18.1 cm

25. The investigators assume x-rays can do which of the following?

A prevent meiosis
B destroy antibodies
C alter DNA molecules
D inhibit natural selection

26. Which of the following is the control?

A the pot labeled 0 seconds
B the pot labeled 2.5 seconds
C the pot labeled 5 seconds
D the pot labeled 10 seconds

27. Which of the following is a correct observation regarding this investigation?

A X-rays can cause mutations in cells.
B X-rays have no effect on plant growth.
C The seed exposed for 10 seconds grew the most.
D The seed exposed for 2.5 seconds grew the least.

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER BOOKLET

NOTHING WRITTEN IN THE SPACE BELOW WILL BE SCORED.

(4 points)

28. This investigation examines the effects of x-ray exposure on plant growth.

- Identify two flaws in this investigation.

- Explain why each is a flaw.

Read the article below and answer questions 29 through 32.

Burning Man

People have been altering the climate since the days of the woolly mammoth.

Humans are constantly manipulating their environment: we now plow over forests to make space for parking lots and giant malls, fill in marshland for seaside condominiums, and muddy the air with car exhaust and industrial pollutants. In the bargain, mankind has altered local ecosystems, raised global temperatures, and perhaps even influenced the patterns of rainfall and the strength of hurricanes (see Rainmakers" in *Discover*, November 1998). But all this inadvertent tinkering with climate and the environment is nothing new. According to geologist Gifford Miller of the University of Colorado at Boulder, it has been going on for many thousands of years.

Miller believes that the systematic burning of vegetation in Australia by early Aboriginal peoples, beginning about 50,000 years ago, caused an irrevocable shift in the flora and the climate of the entire continent. Today, the vast interior of Australia is an arid and desolate place, with nutrient-poor soils and sparse plant life. It was not always so; at many times in the past, the entire continent abounded with lush vegetation and large inland lakes.

Before humans came along, nature alone controlled these changes. According to fossil and other evidence, Australia cycled though long periods of dry and wet conditions from at least 150,000 years ago until about 40,000 years ago. These climatic shifts correspond to a variation in Earth's orbit around the sun, called the Milankovitch cycle, which changes the amount of solar radiation that reaches the planet. The Milankovitch cycle is responsible for the waxing and waning of glaciers in the Northern Hemisphere.

Controlled burning of vegetation by early Australians, Miller thinks, transformed the flora of northern Australia from drought-resistant plants to grassland. The altered landscape influenced the climate and ultimately led to the desertification of

the continent's interior. "Such a shift would have dramatically reduced the recycling of moisture between land and atmosphere," says Miller.

29. The central claim of the article is which of the following?

A The Milankovitch cycle has strongly influenced human cultures.

B Only with modern technology has humanity begun to alter the environment.

C Manipulating the environment is acceptable because people have always done it.

D People have been altering the environment much longer than previously believed.

30. In paragraph 4, the transformation of flora is an example of which process?

A recycling

B predation

C succession

D fossilization

31. According to the article, which of the following is caused by the Milankovitch cycle?

A moraines
B hot spots
C volcanoes
D the jet stream

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER BOOKLET

NOTHING WRITTEN IN THE SPACE BELOW WILL BE SCORED.

(4 points)

32. The article discusses how the environment is affected by human manipulation.

- Which of the current human activities described in paragraph 1 **MOST** resembles the activities of ancient Australians?

- Describe one immediate result of such activities.

- Provide **TWO** strategies for reducing the possibility of this result occurring.

Harriet decided to test several different brands of fertilizer to see which would make her shrubs grow the most. Brand X is organic, which means it contains all-natural ingredients. Brands Y and Z are synthetic, which means their ingredients have been chemically altered to make nutrients more available for plants. The companies that produce brands Y and Z burn large amounts of fossil fuels to supply the energy for these chemical reactions. The ingredients of all three brands are as follows:

	FERTILIZER INGREDIENTS		
	NITROGEN CONTENT	**PHOSPHOROUS CONTENT**	**POTASSIUM CONTENT**
Brand X (Organic)	High	Normal	Normal
Brand Y (Synthetic)	High	Normal	High
Brand Z (Synthetic)	High	High	Normal

To conduct this test, Harriet grew three shrubs each of a different species. She applied a different fertilizer to each shrub once per week for four weeks. After each week, she measured the height of each shrub. This is the chart Harriet created.

HARRIET'S FERTILIZER EXPERIMENT				
FERTILIZER/ PLANT SPECIES	**WEEK 1 HEIGHT**	**WEEK 2 HEIGHT**	**WEEK 3 HEIGHT**	**WEEK 4 HEIGHT**
Brand X applied to Species A	58.5 cm	59.7 cm	61.0 cm	61.0 cm
Brand Y applied to Species B	58.5 cm	61.0 cm	63.5 cm	66.0 cm
Brand Z applied to Species C	58.5 cm	58.5 cm	59.7 cm	59.7 cm

Refer to the text and charts above to answer questions 33 through 36.

33. One ingredient of Brand X is urea, which is composed of broken down protein. An animal breaks down protein in its liver, and filters urea out of its body through its

A immune system.
B excretory system.
C endocrine system.
D circulatory system.

34. Synthetic Brand Y has a disadvantage to organic Brand X because Brand Y

A provides nitrogen.
B provides phosphorous.
C requires renewable resources.
D requires non-renewable resources.

35. Judging from Harriet's table, which of the following is supported by evidence (and is **NOT** an opinion or an assumption) regarding Harriet's shrubs?

A Species B does not need phosphorous in its fertilizer.

B Species C needs high levels of potassium in order to grow.

C Harriet provided more fertilizer for species B than for any other species.

D Species A did not need high levels of phosphorous or potassium to grow.

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER BOOKLET

NOTHING WRITTEN IN THE SPACE BELOW WILL BE SCORED.

(3 points)

36. Harriet's experiment has several problems.

- Give two changes she could make to this experiment to improve her scientific method.

- Explain a reason for one of these changes.

RECYCLED OBJECT	SOURCE MATERIAL	HOW IT IS RECYLED
Oil-based paints	petroleum, a fossil fuel	blended into fuel which can be burned for cement manufacture
Paper	wood	shredding and adding water (The mixture is beaten into a pulpy material. Then the water is pressed out.)
Aluminum	bauxite, an ore of aluminum	melting and reshaping
Plastic	petroleum, a fossil fuel	melting and reshaping
Glass	soda ash (sodium carbonate), lime (calcium oxide), and sand	melting and reshaping
Compost	dead plant and vegetable matter	turned into mulch, a natural soil fertilizer

There is no recycling in Vivian's town, so Vivian draws this picture of a proposed "Recycle Center" to present to the town council. She also creates the table above, describing how items can be recycled. She suggests that items be removed from the Recycle Center once a month.

Refer to the text, table and picture above to answer questions 37 through 40.

37. Which of the following is formed from renewable resources?

A plastic and glass
B paper and compost
C aluminum and compost
D oil-based paint and aluminum

38. Which of the following explains why paper can **NOT** be recycled in the same manner as aluminum?

A Heat does not cause a phase change in paper like it does in aluminum.
B Heat does not cause a nuclear change in paper like it does in aluminum.
C Heat does not cause a chemical change in paper like it does in aluminum.
D Heat does not cause a magnetic change in paper like it does in aluminum.

39. Vivian wants to study more about the nature of plastic and how its source material is collected. Which of the following books should she read?

A a book on mining and a book on the decayed remains of organisms

B a book on nuclear energy and a book on the theory of plate tectonics

C a book on mining and a book on chemically maintaining renewable resources

D a book on nuclear energy and a book on the decomposition of organic material

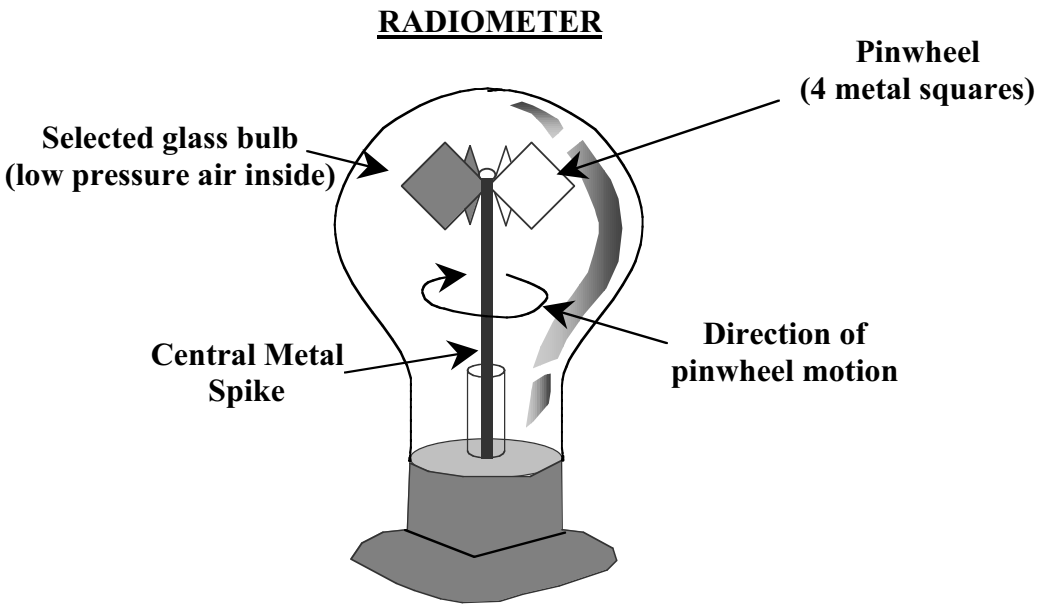
ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER BOOKLET

NOTHING WRITTEN IN THE SPACE BELOW WILL BE SCORED.

(3 points)

40. Vivian claims that her Recycle Center will save energy and preserve the environment. Others claim that one item in Vivian's Recycle Center might harm the environment while being recycled.

- Identify that recycled item.
- Next, explain how this item might directly harm the environment after being recycled.
- Explain how recycling another item might save energy or preserve the environment.



A radiometer looks like the diagram shown above.

Inside a sealed glass bulb, a pinwheel of four metal squares rests loosely on a central metal spike. Each square is black on one side and white on the other. When exposed to sunlight, the black surfaces absorb more light than the white surfaces. This heats the air molecules near the black surfaces causing them to move more quickly. The differences in motion in the air molecules striking the pinwheel cause it to spin. The more light hitting the radiometer, the faster it spins.

Refer to the text and picture above to answer questions 41 through 44.

41. Which investigation would test the hypothesis that black surfaces absorb more light than white surfaces?

A Place the radiometer underwater.

B Put a magnet next to the radiometer.

C Flip the squares inside the radiometer.

D Place the radiometer in complete darkness.

42. The radiometer uses two energy transformations. What are the three forms of energy involved in these transformations, in order from input to output?

A light energy, electrical energy, and heat energy

B light energy, heat energy, and mechanical energy

C light energy, mechanical energy, and chemical energy

D light energy, mechanical energy, and electrical energy

43. Although both the radiometer and photosynthesizing cells make use of the energy in sunlight and molecules, they do **NOT** use them the same way. Which difference listed below describes the difference accurately?

A

RADIOMETER changes	**PHOTOSYNTHESIS changes**
Mass of molecules	Chemical bonds

B

RADIOMETER changes	**PHOTOSYNTHESIS changes**
Mass of molecules	Speed of molecules

C

RADIOMETER changes	**PHOTOSYNTHESIS changes**
Speed of molecules	Mass of molecules

D

RADIOMETER changes	**PHOTOSYNTHESIS changes**
Speed of molecules	Chemical bonds

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER BOOKLET

NOTHING WRITTEN IN THE SPACE BELOW WILL BE SCORED.

(3 points)

44. Some change occurs when the radiometer is exposed to light.

- When the radiometer is exposed to light, predict what would happen if the air in the bulb were removed, creating a vacuum.

- Explain how the investigation remains the same in terms of radiation.

- Explain how the investigation changes in terms of convection.

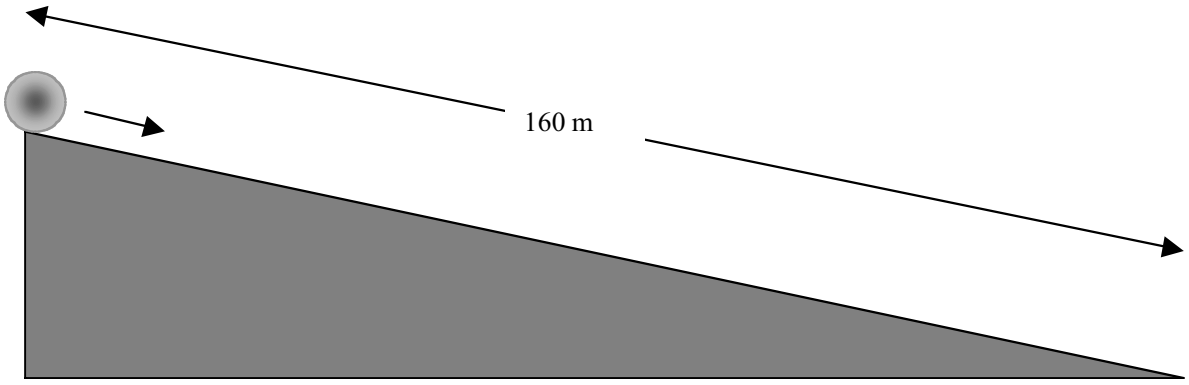
Note:
This test-model draft does not have a second physical science cluster (4 items) to present at this time. Such items are still in production.

49. If one sound has a higher frequency than another, it also has

A less volume.
B a higher pitch.
C greater amplitude.
D a lower Hertz value.

50. During the warm afternoon, Mary submerged her hand in a lake. As she did this, heat was transferred from her skin to the water. This transfer of heat is an example of

A radiation.
B conduction.
C convection.
D evaporation.



TIME/DISTANCE TABLE

Time Elapsed (in seconds)	Distance traveled (in meters)
1	10
2	40
3	90
4	160

51. A ball rolls down an inclined plane. After 2 seconds, what fraction of the ball's original potential energy remains?

A 1/8

B 1/4

C 2/3

D 3/4

52. When the body digests protein, it produces ammonia (NH_3), which is poisonous. The body turns ammonia into urea (CN_2H_4O), which is less poisonous, and passes it out in urine and sweat. The change of ammonia to urea requires the addition of

A a carbon atom and a water molecule.

B an oxygen molecule and a water molecule.

C a carbon atom, an oxygen atom, and a nitrogen atom.

D a carbon atom, an oxygen atom, a nitrogen atom, and a hydrogen atom.

53. In the past, atoms were envisioned to be positively charged spheres embedded with negatively charged electrons like raisins in a cake. This is incorrect because atoms were shown to

A have nuclei at their centers.

B have only negative particles.

C contain very little empty space.

D consist of particles that are equally dense.

Scoring Key
High School MEAP Model Science Test

Item	Answer	MSCF* Code	Note
1	D	V.3.h.4	
2	B	V.3.h.3	
3	B	V.2.h.2	
4	A	V.1.h.1	
5	B	V.3.h.3	
6	A	V.3.h.3	
7	A	V.3.h.3	
8	--	V.3.h.3	refer to the scoring rubric for this constructed-response item
9	A	V.2.h.2	
10	B	V.2.h.2	
11	B	V.2.h.1	
12	--	II.1.h.6	refer to the scoring rubric for this constructed-response item
13	A	III.5.h.4	
14	D	III.2.h.3	
15	D	III.5.h.6	
16	--	II.1.h.1	refer to the scoring rubric for this constructed-response item
17	C	I.1.h.1	
18	D	I.1.h.2	
19	B	III.2.h.3	
20	--	III.5.h.2	refer to the scoring rubric for this constructed-response item
21	B	III.5.h.2	
22	C	III.3.h.1	
23	C	III.2.h.3	
24	B	III.1.h.1	
25	C	III.3.h.3	
26	A	I.1.h.2	
27	D	I.1.h.4	
28	--	I.1.h.2	refer to the scoring rubric for this constructed-response item
29	D	I.1.h.4	
30	C	III.5.h.4	
31	A	V.1.h.1	
32	--	II.1.h.6	refer to the scoring rubric for this constructed-response item
33	B	III.2.h.3	
34	D	V.1.h.3	
35	D	III.2.h.3	
36	--	I.1.h.2	refer to the scoring rubric for this constructed-response item
37	B	V.1.h.3	
38	A	IV.2.h.2	
39	A	V.1.h.3	

40	--	V.1.h.4	refer to the scoring rubric for this constructed-response item
41	C	IV.4.h.2	
42	B	IV.2.h.4	
43	D	IV.2.h.4	
44	--	IV.3.h.2	refer to the scoring rubric for this constructed-response item
45	model items not available		
46	model items not available		
47	model items not available		
48	model items not available		
49	B	IV.4.h.3	
50	B	IV.2.h.5	
51	D	IV.3.h.2	
52	D	IV.2.h.1	
53	A	IV.1.h.3	

*Michigan Science Curriculum Framework, Summer 2000

GRADE 11 MODEL TEST
SCORING RUBRIC FOR CONSTRUCTED RESPONSE ITEMS

Item 8

Scoring Points:

3 = two valid corrections with a valid explanation for one of them
2 = two of the three parts correct
1 = one valid correction
0 = student fails to understand the task

Item 12

Scoring Points:

3 = student correctly explains how the Aral Sea decline might affect local farming and fishing industries, and the stands representatives of these industries might take regarding the Aral Sea
2 = two of the above three answers are given correctly
1 = one of the above three answers is given correctly
0 = student fails to understand the task

Item 16

Scoring Points:

3 = student correctly provides two flaws of the investigation and correctly explains one of these flaws
2 = student correctly provides two flaws of the investigation and correctly explains neither of these flaws. Or the student correctly provides one flaw of the investigation and correctly explains this flaw
1 = student correctly provides one flaw of the investigation
0 = student fails to understand the task, or fails to provide a response

Item 20
Scoring Points:

3 = student correctly explains how the venus flytrap resembles heterotrophs and provides two correct reasons why scientists classify venus flytraps as producers
2 = student correctly explains how the venus flytrap resembles heterotrophs and provides one correct reason why scientists classify venus flytraps as producers. Or a Student correctly provides two correct reasons why scientists classify venus flytraps as producers
1 = student correctly explains how the venus flytrap resembles heterotrophs or provides one correct reason why scientists classify venus flytraps as producers
0 = student fails to understand the task

Item 28 (Investigation item: 4 points in the **new** test)
Scoring Points:

4 = student correctly identifies two flaws of the investigation and correctly explains why each is a flaw
3 = student correctly identifies two flaws of the investigation and correctly explains why one is a flaw
2 = student correctly identifies two flaws of the investigation. Or the student correctly identifies one flaw and correctly explains why it is a flaw
1 = student correctly identifies one flaw of the investigation
0 = student fails to understand the task

Item 32 (Text Criticism item)
Scoring Points:

4 = student identifies the correct harmful activity, a correct result of this activity, and two correct strategies to prevent this result
3 = three of the above four points are given correctly
2 = two of the above four points are given correctly
1 = one of the above four points is given correctly
0 = student fails to understand the task, or fails to provide a response

Item 36

Scoring Points:

3 = Student correctly identifies the recycled item, and correctly explains how this item harms the environment after being recycled and how recycling another item might preserve energy or the environment

2 = Student correctly provides two of the above answers

1 = Student correctly provides one of the above answers

0 = Student fails to understand the task

Item 44

Scoring Points:

3 = student provides a correct prediction as well as a correct explanation in terms of radiation and a correct explanation in terms of convection

2 = any two of the above three answers are given correctly

1 = any one of the above three answers is given correctly

0 = student fails to understand the task